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STATUS REPORT ON
Cirsium aridum
IN WEST-CENTRAL WYOMING

Prepared for the Bureau of Land Management
Wyoming State Office, Rawlins District,
and Rock Springs District

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I. INTRODUCTION

While conducting field work in the Beaver Rim area of central Wyoming in 1990, botanist Robert Dorn discovered a population of an unusually pubescent native thistle. After additional study of this and two other populations in the western Wind River Basin and Green River Basin, Dorn described the plants as a new species, Cirsium aridum (Dorn 1992).

Due to its limited distribution, Cirsium aridum has been designated as a Category 2 (C2) candidate for listing under the Endangered Species Act by the US Fish and Wildlife Service (USFWS) (1993). Under Bureau of Land Management (BLM) Manual 6840, the BLM is directed to manage USFWS candidate species in such a manner that these species and their habitats are conserved and to ensure that agency actions do not contribute to the need to list these species as Threatened or Endangered (Willoughby et al. 1992). C. aridum is currently managed as a Special Status plant species by the BLM Rock Springs District (Amidon 1994).

In 1994, the Rawlins District and Wyoming State Office of the BLM contracted on a cost-share basis with The Nature Conservancy's Wyoming Natural Diversity Database (WYNDD) to conduct field surveys for Cirsium aridum on public lands in west-central Wyoming. The objectives of this project were to collect information on the biology, distribution, habitat use, population size, and potential threats to this species to be used in guiding management decisions. In addition, a permanent monitoring plot was established and baseline demographic and population trend data were collected.

II. METHODS

Information on habitat and distribution of Cirsium aridum was obtained from secondary sources, including WYNDD files and computer databases, collections of the Rocky Mountain Herbarium (RM), the literature, and knowledgeable individuals. USGS topographic maps, geologic maps (Love and Christiansen 1985), and BLM land status maps were used to identify areas of potential habitat for ground survey.

Field surveys were conducted by WYNDD staff (George Jones and Walter Fertig) from June to November 1994 (survey routes and collection sites are indicated in Appendix B). Data on biology, habitat, population size, and management needs were collected using WYNDD plant survey forms (Appendix C). Locations of occurrences were mapped on 7.5' USGS topographic maps. If populations were sufficiently large, voucher specimens were collected for deposit at the RM and BLM herbaria. Information gathered in the field was entered into the computerized Element Occurrence database of WYNDD.

A permanent monitoring transect was established at the south end of Cedar Rim following the protocol of Lesica (1987). The transect consisted of a single belt 1 m x 40 m long, subdivided into 40 1 m x 1 m cells. Within each cell, individual plants were mapped and assigned to one of four age classes: seedling (vegetative rosettes with 1-2 leaves), reproductive (with one or more flowering or fruiting stems), vegetative (stemless rosettes with three or more leaves), and dead. The number of flowering and fruiting stems and vegetative rosettes per plant was also tallied. This technique generated quantitative data on population size, density, age distribution, and reproductive potential. Baseline data from this transect are included in Appendix D.

III. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Cirsium aridum Dorn (Dorn 1992).
2. SYNONYMS: None.
3. COMMON NAME: Cedar Rim thistle.
4. FAMILY: Asteraceae (Sunflower family).
5. SIZE OF GENUS: Cronquist (1994) estimates that the genus Cirsium contains as many as 200 species in the Northern Hemisphere, of which about 70 are native to North America. Dorn (1992) lists 18 species and four varieties of Cirsium in Wyoming.
6. PHYLOGENETIC RELATIONSHIPS: Dorn (1992) places Cirsium aridum in the C. hookerianum group, although he acknowledges that it does not closely resemble any species in the group. As defined by Moore and Frankton (1965), species in the C. hookerianum complex have compact terminal heads, unbranched stems, lanceolate phyllaries with curled but not dilated tips, involucre pubescence of broad, multicellular hairs, and leaves that are not markedly decurrent. C. aridum lacks the pubescence and leaf features that help unify this group. It appears to more closely resemble C. pulcherrimum and other members of section Onotrophe in involucre pubescence and leaf decurrence (Moore and Frankton 1963; Gardner 1974; Dorn 1992). No cytotaxonomic studies have been undertaken to further elucidate the affinities of C. aridum.

7. TAXONOMIC CONSIDERATIONS: The delimitation of C. aridum, particularly in relation to C. pulcherrimum, is made difficult by the widespread occurrence of forms intermediate between the morphological extremes of the two taxa. Typically, C. pulcherrimum has green, glabrous upper leaf surfaces and achenes with yellow apical collars, but woolly-pubescent specimens without achene collars can also be found. I have chosen to interpret densely woolly plants with compact heads and spiny peduncles that occur in barren, basin habitats as C. aridum. This view expands Dorn's typological interpretation of the species to include extremely woolly-pubescent forms previously considered as C. pulcherrimum. This broader viewpoint reduces (but does not eliminate) the difficulty in distinguishing these taxa in the field. Additional taxonomic research is needed to determine additional characters that may be useful in distinguishing C. aridum from C. pulcherrimum (R. Dorn, personal communication). Dorn recommends using Thin-layer Chromatography techniques employed by Gardner (1974) to help elucidate the taxonomic relationships of C. aridum.

Mixed populations, containing Cirsium aridum, C. pulcherrimum, and intermediate plants have been observed at several sites along Beaver Rim and in the Green River and Great Divide basins. Patterns like this suggest that the two species may not be completely reproductively isolated from each other and may represent diverging, but not completely distinct, species. Additional taxonomic study may result in the reduction of C. aridum to a variety of C. pulcherrimum.

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. NATIONAL

- a. LEGAL STATUS: Listed as a Category 2 (C2) species by the USFWS (US Fish and Wildlife Service 1993). Category 2 includes taxa for which there is current evidence of vulnerability, but for which USFWS lacks sufficient biological data or field survey information to support a listing proposal.
- b. HERITAGE RANK: Cirsium aridum was formerly ranked G1 in The Nature Conservancy's Natural Heritage Network system. As a species, it

was considered critically imperiled because of extreme rarity throughout its range (known from less than 5 extant occurrences). Based on the discovery of 13 new occurrences during field surveys and herbarium studies in 1994-95, the rank of C. aridum has been upgraded to G2 status. G2 species are considered imperiled because of rarity (6-20 occurrences) or because of factors demonstrably making a species vulnerable to extinction throughout its range.

2. STATE

a. LEGAL STATUS: None.

b. HERITAGE RANK: WYNDD formerly ranked this species as S1, indicating that it was critically imperiled because of extreme rarity in the state of Wyoming (Fertig 1994 a). Based on discoveries in 1994-95, the state rank of C. aridum has been upgraded to S2 status. S2 species are considered imperiled in the state due to rarity (6-20 occurrences are known) or because of factors demonstrably making it vulnerable to extinction.

C. DESCRIPTION

1. GENERAL NON-TECHNICAL DESCRIPTION: Cirsium aridum is a taprooted perennial herb with loosely to densely woolly-pubescent stems to 12 inches (30 cm) tall (Figures 1-2). Stem leaves are alternate, shallowly pinnately-lobed and continue down the stem 1/4-7/8 inches (5-20 mm) beyond the point of attachment (decurrent). Leaf margins and bases have sharp yellow spines 1/16-3/16 inches (2-8 mm) long. Leaves are white to gray hairy above (with the hairs typically obscuring the grayish-green leaf surface) and densely white-woolly beneath. Three to seven rectangular heads of lavender flowers are clustered at the top of the stem above the leaves. The involucre is sparsely pubescent with cottony hairs or nearly glabrous and consists of long, yellow spine-tipped outer bracts and spineless inner bracts. Mature fruits (achenes) are cream-colored with fine brown streaks and typically lack a yellow rim at the top (Dorn 1992; Fertig 1993; Fertig et al. 1994).

Figure 1. Line drawing of *Cirsium aridum* from Dorn (1992).
Illustration by Jane L. Dorn.

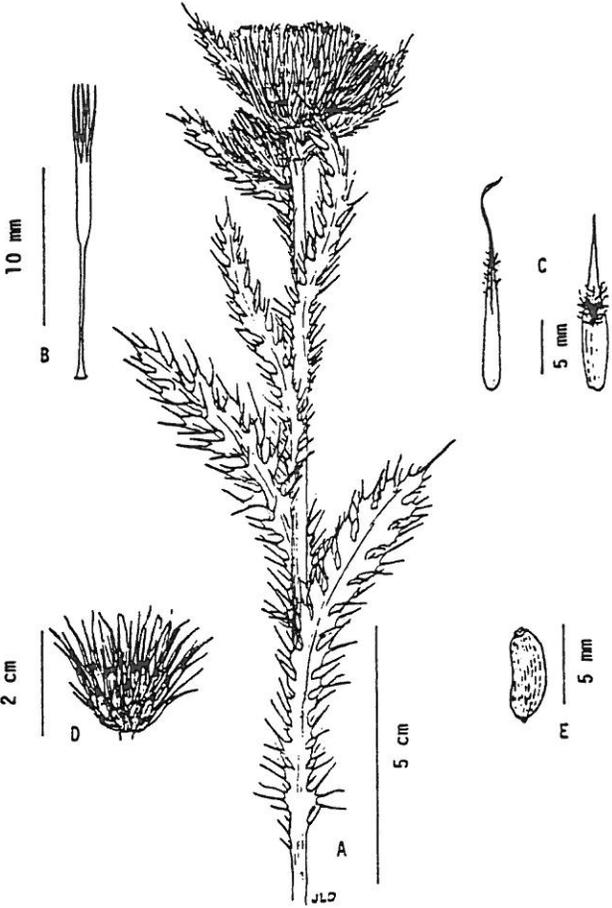


Figure 2. Cirsium aridum from the south end of Cedar Rim, Fremont County, Wyoming. Plant in full flower in June, 1994. Note the decurrent bases of the stem leaves and the gray-woolly pubescence of leaves and stems. WYNDD photograph by W. Fertig.



2. TECHNICAL DESCRIPTION: Perennial herb. Taproot thick, sometimes branched. Stems loosely to densely tomentose, to 3 dm high. Leaves basal and alternate, gradually reduced upward, the blades linear-elliptic, 3-9 cm long, 0.5-3 cm wide, loosely tomentose above, densely white-tomentose below, shallowly to deeply pinnately lobed, marginal spines 2-8 mm long, cauline leaves mostly decurrent for 5-20 mm. Heads 3-7, mostly crowded at tip of stem, 15-25 mm high, not quite as wide. Involucre sparsely tomentose to glabrate, phyllaries in several series, outer phyllaries tipped with a yellow spine 4-8 mm long, the innermost phyllaries often spineless and with a curled tip. Corolla lavender, about 18 mm long, the tube about 8 mm long, the throat 5-6 mm long, the lobes 5-6 mm long. Pappus slightly shorter than corolla, bristles plumose. Mature achenes cream-colored with fine brown streaks, about 5-6 mm long and 2-2.5 mm wide, yellow apical collar lacking (adapted from Dorn 1992).
3. LOCAL FIELD CHARACTERS: Cirsium aridum can be recognized by its leaf pubescence (whitish-gray woolly above and densely white-woolly below), short-spiny leaf margins, long decurrent leaf bases, and crowded inflorescences of rectangular, lavender flower heads on short, spiny peduncles.
4. SIMILAR SPECIES: Cirsium pulcherrimum is usually taller, with greenish, glabrous upper leaf surfaces and fruits often with a distinctive yellow rim at the top. Some specimens may resemble C. aridum in having thinly hairy upper leaf surfaces. C. hookerianum typically has short-clasping upper leaves and involucre with broad, multi-celled (glass-like) hairs rather than thin, cottony or cobwebby pubescence. C. subniveum typically has a more open inflorescence with heads on densely woolly, spineless stalks, short-clasping upper stem leaves, and involucre with stringy hairs conspicuously connecting adjacent bracts. C. canescens and C. ochrocentrum, two Great Plains species, have more deeply lobed leaves and squarish heads, often with the involucre exceeding 30 mm in length (Dorn 1992; Fertig et al. 1994).

Cirsium barnebyi, a recently described species from Utah and Colorado, resembles C. aridum in stature, pubescence, and habitat, but can be distinguished by its stiff, erect-ascending inner

involucre bracts and twice-pinnately lobed leaves (Welsh et al. 1993). Cronquist (1994) reports C. barnebyi from Carbon County, Wyoming, potentially within the currently known range of C. aridum.

D. GEOGRAPHICAL DISTRIBUTION

1. RANGE: Cirsium aridum is endemic to the Wind River Basin, Sweetwater River Valley, Green River Basin, and western Great Divide Basin in west-central Wyoming (Figure 3). In addition to Fremont and Sublette counties, it is now known to occur in northern Sweetwater and northwestern Carbon counties. The entire known range of C. aridum is contained within an area approximately 70 miles x 135 miles (9450 square miles). Within this large range, populations are primarily concentrated in the Beaver Divide, Muddy Gap, and Big Piney areas.

2. EXTANT SITES: Prior to 1994, Cirsium aridum was known from only four populations. Each of these populations was relocated in 1994 and found to be more extensive than previously reported. Surveys by WYNDD and RM staff in 1994 also resulted in the discovery of 9 new occurrences, including the first records for the Great Divide Basin and Sweetwater County. In addition, a review of misidentified Cirsium specimens at the RM resulted in the recognition of 4 new locations, including the first reports from Carbon County. In all, 17 extant populations are currently recognized in Wyoming.

Exact locations of these populations are listed in Table 1. Element Occurrence Records and maps are provided in Appendix A.

3. HISTORICAL SITES: None known.

4. UNVERIFIED/UNDOCUMENTED REPORTS: Occurrence # 007, located on an unnamed ridge approximately 6 air miles east-northeast of Big Piney, is based on observations of vegetative material (Fertig 1994 b). This area should be resurveyed to confirm the presence of Cirsium aridum.

5. AREAS SURVEYED BUT SPECIES NOT LOCATED: Surveys in 1994 focused primarily on outcrops of whitish sandstone along Cedar Rim and Beaver Rim from the Sweetwater River to Oil Mountain in southern Fremont County. Additional surveys were conducted in the vicinity of Big Piney and Yellow Point

Figure 3. Wyoming distribution of Cirsium aridum.

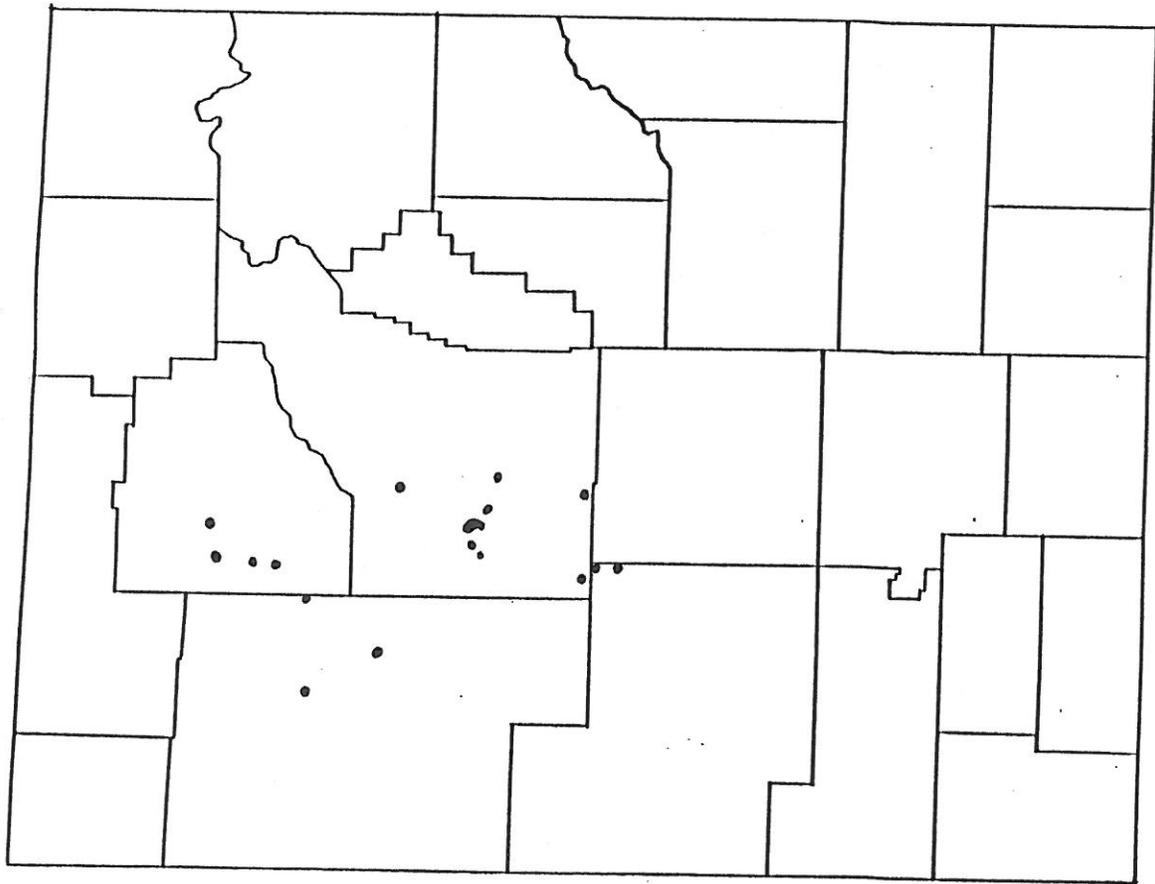


Table 1. Location information for known populations of Cirsium aridum in west-central Wyoming.

1. Green River Basin:

Occurrence # 001

County: Sublette.

Legal Description: T28N R110W S6, 8 (SW4 of SE4); T28N R111W S36 (SW4 of SW4).

Latitude: 42° 25' 00" N (centrum).

Longitude: 109° 56' 35" W (centrum).

Elevation: 7050-7200 ft (2150-2195 m).

USGS 7.5' Quads: Oasis Well and Sugar Loaf NW.

Location: About 8 miles southeast of Big Piney, 12-14 air miles northeast of La Barge. Three subpopulations: (1) approximately 0.5 miles east of Vital Reservoir, about 1 mile north of Reardon Draw Road, (2) South Branch of Chapel Canyon, (3) Reardon Draw.

Occurrence # 004

County: Sublette.

Legal Description: T28N R108W S8 (NE4); T29N R108W S27 (SW4 of SW4 of SW4), 28 (SE4 of SE4 of SE4), 33 (SW4 & NE4 of NE4 of NE4).

Latitude: 42° 25' 46" N (centrum).

Longitude: 109° 43' 10" W (centrum).

Elevation: 7100-7240 ft (2165-2210 m).

USGS 7.5' Quad: Stud Horse Butte.

Location: Yellow Point Ridge, approximately 31.5 air miles south of Pinedale and about 27 air miles northwest of Farson.

Occurrence # 005

County: Sweetwater.

Legal Description: T21N R105W S32 (E2), 33.

Latitude: 41° 44' 50" N (centrum).

Longitude: 109° 19' 16" W (centrum).

Elevation: 6800-7000 ft (2075-2135 m).

USGS 7.5' Quad: Pilot Butte.

Location: East slope of White Mountain, 0.5-1.5 miles north of US Highway 191, about 10 air miles north-northwest of Rock Springs.

Occurrence # 007

County: Sublette.

Legal Description: T30N R110W S19 (SW4).

Latitude: 42° 33' 50" N.

Longitude: 110° 00' 08" W.

Elevation: 7000 ft (2135 m).

USGS 7.5' Quad: Big Piney East.

Location: Base of unnamed north-south trending ridge about

Table 1 (continued)

1.5 miles south of Wyoming State Highway 351,
approximately 6 air mi east-northeast of Big Piney.

Occurrence # 016

County: Sublette.

Legal Description: T28N R107W S35 (S2).

Latitude: 42° 21' 07" N.

Longitude: 109° 32' 12" W.

Elevation: 6900-6990 ft (2100-2130 m).

USGS 7.5' Quad: Juel Spring.

Location: About 1 mile west of the Big Sandy River, about
3.5 miles north-northeast of Juel Reservoir,
approximately 18 air miles north of Farson.

Occurrence # 017

County: Sweetwater.

Legal Description: T26N R105W S19, 20.

Latitude: 42° 13' 00" N.

Longitude: 109° 22' 25" W.

Elevation: 6700 ft (2040 m).

USGS 7.5' Quad: Eden Reservoir.

Location: South shore of Eden Reservoir, about 8.5 air
miles northeast of Farson.

2. Wind River Basin and Beaver Divide

Occurrence # 002

County: Fremont.

Legal Description: T30N R96W S2 (SW4), 3 (SE4), 11 (NW4),
12 (SE4 of SW4); T31N R95W S13 (NW4 of NW4), 21 (SE4 of
SE4), 22 (W2 of SW4), 27 (SE4 of NW4 & SE4 of SW4), 29
(NE4 of NW4), 30 (SW4 of NE4), 34 (NW4); T31N R96W S25
(E2).

Latitude: 42° 38' 20" N (centrum).

Longitude: 108° 13' 12" W (centrum).

Elevation: 6600-7100 ft (2010-2165 m).

USGS 7.5' Quads: Dishpan Butte, Red Canyon, and Sweetwater
Station Quads.

Location: Beaver Rim area, extending from Crooked Creek and
Cottonwood Creek northeastward along the west slope and
summit of the rim to Devil's Gap and Dishpan Butte.
This occurrence also extends across Wyoming state
Highway 135 along the Cedar Rim Draw Road and on the
southern and southwestern slopes of Cedar Rim. Divided
into 8 discrete subpopulations, all separated by less
than two miles.

Table 1 (continued)

Occurrence # 003

County: Fremont.

Legal Description: T32N R95W S26 (S2 of NE4), 34 (SE4 of SW4).

Latitude: 42° 42' 00" N (centrum).

Longitude: 108° 10' 31" W (centrum).

Elevation: 6800-7100 ft (2070-2165 m).

USGS 7.5' Quad: Dishpan Butte.

Location: West side of Beaver Divide on slopes above summit where Wyoming state Highway 135 drops off of the rim.

Occurrence # 008

County: Fremont.

Legal Description: T32N R100W S10 (SE4).

Latitude: 42° 45' 23" N.

Longitude: 108° 45' 57" W.

Elevation: 6600-6800 ft (2010-2075 m).

USGS 7.5' Quad: Mount Arter SE.

Location: North slope of Table Mountain, about 5 air miles southwest of Lander.

Occurrence # 010

County: Fremont.

Legal Description: T33N R95W S14 (SW4 of SW4).

Latitude: 42° 49' 45" N.

Longitude: 108° 11' 05" W.

Elevation: 5800 ft (1770 m).

USGS 7.5' Quad: Sand Draw.

Location: West slope of Oil Mountain, north of Sand Draw Oil Field.

Occurrence # 011

County: Fremont.

Legal Description: T30N R95W S31 (SE4 of SW4).

Latitude: 42° 31' 35" N.

Longitude: 108° 14' 20" W.

Elevation: 6620 ft (2020 m).

USGS 7.5' Quad: Sweetwater Station.

Location: North of Sweetwater River, about 3.5 air miles west-southwest of Sweetwater Station.

Occurrence # 012

County: Fremont.

Legal Description: T29N R96W S5 (NE4 of NW4); T30N R96W S33 (SE4 of NW4).

Latitude: 42° 31' 17" N.

Longitude: 108° 20' 15" W.

Elevation: 7150 ft (2180 m).

USGS 7.5' Quad: Red Canyon.

Table 1 (continued)

Location: Beaver Rim, approximately 11-13 miles west-southwest of Sweetwater Station, about 0.25 miles northwest of the Atlantic City-Hudson Road.

Occurrence # 013

County: Fremont.

Legal Description: T32N R90W S17, 18.

Latitude: 42° 44' 55" N.

Longitude: 107° 38' 25" W.

Elevation: 6880 ft (2100 m).

USGS 7.5' Quad: Coyote Springs.

Location: Beaver Divide, Gas Hills Mining District, about 4.2 air miles south-southwest of intersection of Gas Hills Road with Ore Road (main road through Gas Hills Mining District), about 2 miles east of Mud Springs.

3. Great Divide Basin:

Occurrence # 006

County: Sweetwater.

Legal Description: T23N R101W S4 (NW4 of NW4), 5 (NE4 of NE4).

Latitude: 42° 00' 02" N.

Longitude: 108° 51' 33" W.

Elevation: 7500 ft (2285 m).

USGS 7.5' Quad: Freightier Gap.

Location: East end of Steamboat Mountain Rim, 0.75-1 mile east of Freightier Gap.

4. Sweetwater River Valley and Muddy Gap area

Occurrence # 009

County: Fremont.

Legal Description: T27N R90W S1, 2, 3.

Latitude: 42° 20' 37" N.

Longitude: 107° 33' 07" W.

Elevation: 6800 ft (2075 m).

USGS 7.5' Quad: Whiskey Peak.

Location: Big Camp Creek area, about 6 air miles west-southwest of Muddy Gap Junction.

Occurrence # 014

County: Carbon.

Legal Description: T28N R89W S32.

Latitude: 42° 21' 25" N.

Longitude: 107° 29' 35" W.

Elevation: 6680-6920 ft (2035-2110 m).

USGS 7.5' Quad: Muddy Gap.

Location: Red Hills, west-northwest of Muddy Gap, about 2.5 air miles west-southwest of Muddy Gap Junction.

Table 1 (continued)

Occurrence # 015

County: Carbon.

Legal Description: T28N R88W S27, 34.

Latitude: 42° 21' 44" N.

Longitude: 107° 20' 05" W.

Elevation: 6200 ft (1890 m).

USGS 7.5' Quad: Youngs Pass.

Location: Approximately 5 miles north of the Ferris
Mountains along Little Cherry Creek, about 6 air miles
east of Muddy Gap Junction.

Ridge in Sublette County, in the South Pass area of Fremont County, and along the western rim of the Great Divide Basin in northern Sweetwater County. Survey routes are shown in Appendix B.

E. HABITAT

1. ASSOCIATED VEGETATION: Cirsium aridum typically occurs on barren slopes, fans, and draws on whitish-gray sandstone, chalk, tufaceous colluvium, or clay substrates (Figure 4). Areas of suitable habitat often occur as "islands" within other, more extensive communities dominated by Wyoming big sagebrush (Artemisia tridentata var. wyomingensis) grasslands or dense montane shrubs. Grass cover in C. aridum habitat is typically low, consisting mostly of scattered bunches of bluebunch wheatgrass (Elymus spicatus), Indian ricegrass (Oryzopsis hymenoides), and Contracted Indian ricegrass (O. contracta). C. aridum may also colonize disturbed sites, such as graded dirt roads and barrow pits, provided the proper substrate is exposed.

2. FREQUENTLY ASSOCIATED SPECIES:

Arenaria hookeri (Hooker's sandwort)
Astragalus kentrophyta (Thistle milkvetch)
Astragalus serioleucus var. aretioides (Cushion milkvetch)
Cirsium pulcherrimum (Prettiest thistle)
Cryptantha caespitosa (Caespitose cat's-eye)
Elymus spicatus (Bluebunch wheatgrass)
Erigeron compositus (Cut-leaved daisy)
Eriogonum brevicaulis var. micranthum (Shortstem wild buckwheat)
Eriogonum ovalifolium var. purpureum (Cushion wild-buckwheat)
Haplopappus armerioides (Thrift goldenweed)
Haplopappus nuttallii (Nuttall's goldenweed)
Ivesia gordonii (Gordon's ivesia)
Leptodactylon pungens (Granite prickly-gilia)
Lesquerella alpina var. condensata (Condensed bladderpod)
Linum kingii (King's yellow-flax)
Lomatium nuttallii (Nuttall's biscuitroot)
Lupinus argenteus (Silvery lupine)
Oryzopsis contracta (Contracted Indian ricegrass)
Oryzopsis hymenoides (Indian ricegrass)
Paronychia sessiliflora (Whitlow-wort)
Penstemon caespitosus (Mat beardtongue)
Penstemon paysoniorum (Payson's beardtongue)

Phacelia glandulosa (Shale phacelia)
Phlox hoodii (Hood's phlox)
Phlox muscoides (Squarestem phlox)
Phlox pungens (Beaver Rim phlox)
Physaria eburniflora (Devil's Gate twinpod)
Thermopsis rhombifolia var. annulocarpa (Round-leaved golden-pea)
Townsendia spathulata (Sword-leaf Easter-daisy)
Trifolium gymnocarpon (Hollyleaf clover)
Yermo xanthocephalus (Desert yellowhead)

3. TOPOGRAPHY: Cirsium aridum typically occurs on south or west-facing slopes, narrow draws, and shallow depressions on barren, fine-textured substrates (Figure 5). Plants are often absent from convex-shaped slopes, rim tops, and valley bottoms (Fertig 1994 c). Known occurrences range in elevation from 5800-7500 feet (1770-2285 m).
4. SOIL RELATIONSHIPS: Occurrences of Cirsium aridum surveyed in 1994 were all observed on substrates derived from Tertiary sediments. In the Beaver Rim area, plants were observed on outcrops of whitish sandstone and tufaceous colluvium derived from the Split Rock, White River, Wagon Bed, and Wind River Formations (Van Houten 1964). Populations in the Green River Basin have been observed on light-colored sandstone and marlstone of the Green River or Wasatch Formations (Love and Christiansen 1985). At all sites, soils are generally fine-textured and dry.
5. REGIONAL CLIMATE: Average annual precipitation is 8-10 inches (203-254 mm) in the Green River Basin and 10-12 inches (254-304 mm) in the Great Divide and Wind River basin portions of the range of Cirsium aridum. Throughout this area, peak levels of precipitation are in April, May, and June. Mean annual temperatures range from 36° F (2.2° C) in the Green River Basin to 44° F (6.7° C) in the Wind River Basin. In the Green River Basin mean maximum and minimum January temperatures are 26° F (- 3.3° C) and - 2 to - 6° F (- 20° C), while comparable temperatures in the Wind River Basin are 34° and 10° F (1.1° and - 12.2° C). Mean maximum and minimum temperatures in July are 81° and 0° F (27.2° and 4.4° C) in the Green River Basin and 86° and 54° F (30° and 12.2° C) in the Wind River Basin (Martner 1986).

Figure 4. Habitat of Cirsium aridum at the south end of Cedar Rim, Fremont County, Wyoming. Plants occur in a shallow erosional basin on white, ashy tufaceous deposits of the Split Rock Formation. Yellow-flowered plant in the foreground is Yermo xanthocephalus. Photograph by Charmaine Refsdal.

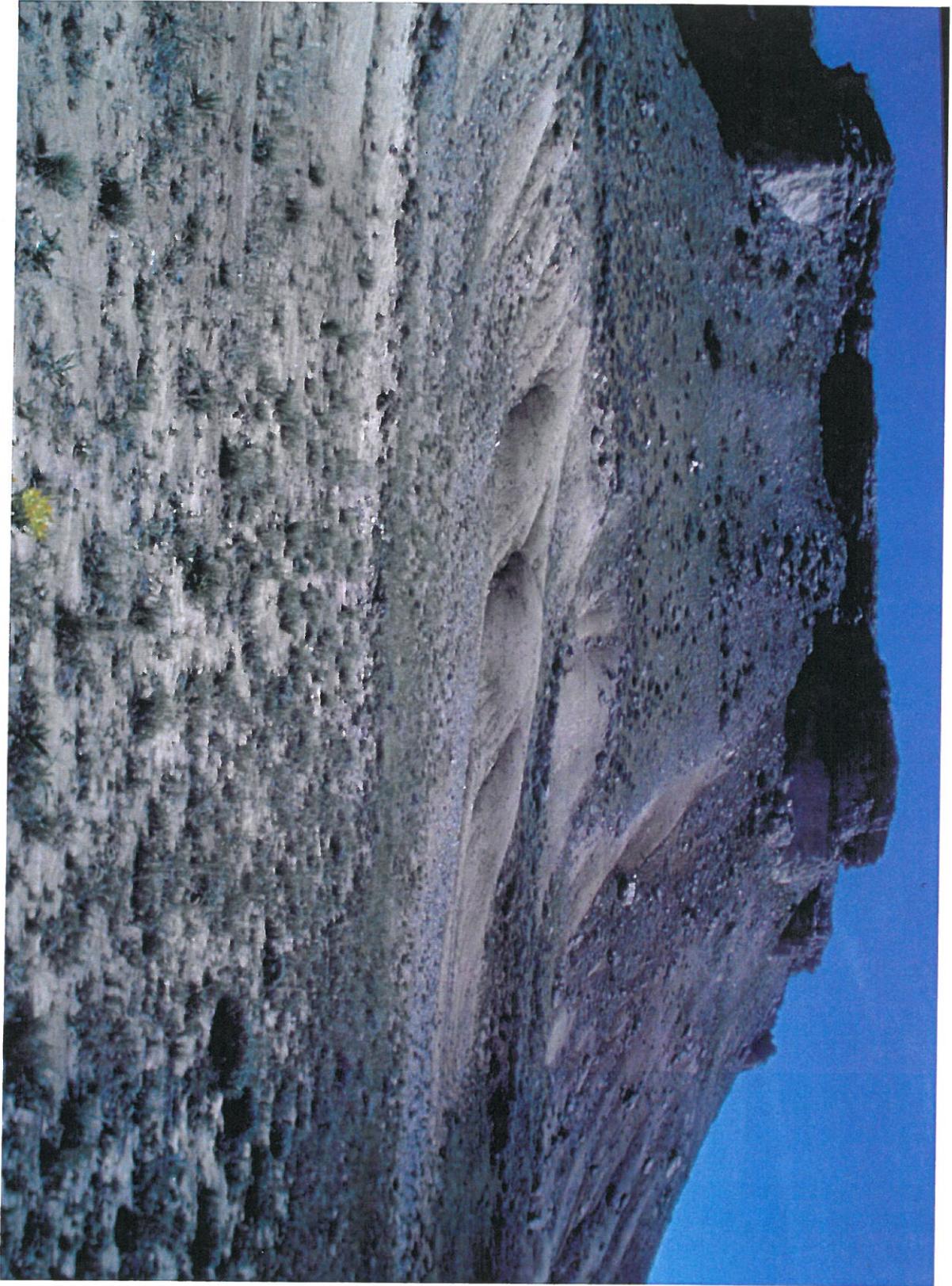
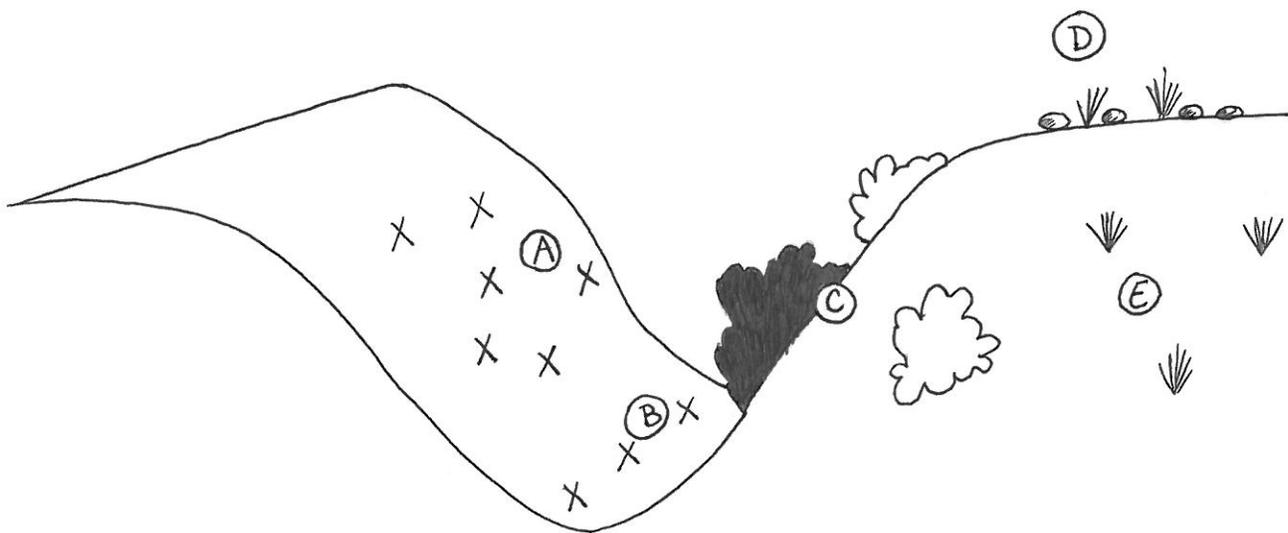


Figure 5. Position of Cirsium aridum on the landscape.
Illustration by W. Fertig.

A. Slopes and fans of whitish, chalky sandstone, clay or tufaceous colluvium with low vegetative cover. B. Narrow, dry, sandy draws with low vegetative cover. C. Shrubby slopes with high vegetative cover, substrate various but typically not as in "A". D. Cushion plant communities on dry, windswept, gravelly ridgetops and mesas. E. Convex-shaped slopes with low plant cover. C. aridum may be present in A and B, but typically not in C-E.



X = Cirsium aridum

6. LOCAL MICROCLIMATE: Microsites occupied by Cirsium aridum are generally light-colored, sparsely vegetated, and exposed to prevailing winds. These sites are likely to have higher surface temperatures and higher rates of evaporation than adjacent, well-vegetated areas.

F. POPULATION BIOLOGY AND DEMOGRAPHY

1. PHENOLOGY: Flowering occurs from mid June to late July or early August, probably depending on seasonal moisture conditions. Mature fruits have been observed from late July to early September.
2. POPULATION SIZE AND CONDITION: There are currently 17 known populations of Cirsium aridum. Populations and subpopulations surveyed in 1994 were usually found to be locally abundant, although often widely spaced and restricted to small pockets of suitable habitat. Populations ranged in size from 3 rosettes to 5000-6000 individuals. The total number of flowering and fruiting plants observed in 1994 is estimated to be 8000-10,000. Based on data from a demographic monitoring plot, flowering and fruiting plants may account for only 20% of the total population at a site, suggesting that the estimated population may be as high as 40,000-50,000 plants. Population size data are not available for most sites, further suggesting that 1994 observations are conservative.

Live seedlings accounted for 10% and vegetative rosettes accounted for nearly 50% of the total population in demographic monitoring plots in 1994. Another 21% of all plants were dead. The longevity of flowering and fruiting plants is not known at present.

Density was observed to be 1.4 plants per square meter at the monitoring site. Flowering and fruiting individuals were observed at a density of 0.28 per square meter. Comparable densities were observed at other sites. Plants typically showed a non-random distribution pattern and were often clumped.

Individual populations range in size from 0.1 to over 50 acres. Approximately 150 acres of occupied habitat were observed in 1994 surveys. The area of most occurrences has not been measured or is not known. Based on the availability of

suitable habitat, the total range of the species may cover several thousand acres.

Demographic data collected in 1994 are summarized in Table 2 and Appendix D.

3. REPRODUCTIVE BIOLOGY

- a. TYPE OF REPRODUCTION: Cirsium aridum is a perennial that reproduces by seed. Mature plants may develop branched rootstalks, but do not spread by rhizomes or other vegetative means.
- b. POLLINATION BIOLOGY: The specific pollinator of Cirsium aridum is unknown. A metallic green bee (possibly of the family Halictidae) was observed on flower heads during 1994 field surveys and may be a potential pollinator.
- c. SEED DISPERSAL AND BIOLOGY: The single-seeded, indehiscent fruits (achenes) of Cirsium aridum have a parachute-like pappus of feathery (plumose) bristles. Dispersal is primarily by the wind.

The germination requirements of the seeds are not currently known, but it is likely that seedling recruitment is dependent on favorable spring and summer moisture conditions. Seedlings accounted for 10% of the total population in monitoring plots in 1994. Although no dead seedlings were observed, larger and presumably older rosettes suffered a mortality rate of 30.8% in 1994 (accounting for 21% of the entire plant population).

G. POPULATION ECOLOGY

1. GENERAL SUMMARY: Cirsium aridum is typically restricted to small and somewhat isolated pockets of suitable habitat with low vegetative cover. Occurrences are most often associated with sandstone, colluvium, or clay substrates. Although occurrences may be locally numerous, individual populations are often sparse and limited by the amount of available habitat.

Table 2. Demographic information for populations of Cirsium aridum surveyed in 1994.

1. Green River Basin:

Occurrence # 001

Area: 5-6 acres.

Number and age of plants: The South Branch of Chapel Canyon subpopulation was observed to be "common" in September 1994. Population size data are not available for the other subpopulations.

Density: Not known.

Presence of dispersed seed: Not known.

Evidence of reproduction: Plants observed in flower and fruit in 1991 and 1994.

Evidence of expansion/contraction: Population found to be more extensive in 1994 than previously known.

Occurrence # 004

Area: 45 + acres.

Number and age of plants: Plants observed to be locally common in 1993 and 1994. Typically, 20-30 plants observed in each draw or other localized area of suitable habitat. Total population estimated at 400-500 plants.

Density: Plants exhibit a non-random, clumped distribution pattern.

Presence of dispersed seed: None observed.

Evidence of reproduction: Plants observed in flower at this site in 1993. Post-reproductive plants (with the fruits already dispersed) observed in Fall 1994.

Evidence of expansion/contraction: This population was found to be slightly more extensive than previously known in 1994 follow-up survey. Population size appears to be stable at present.

Occurrence # 005

Area: 12 acres.

Number and age of plants: Population estimated at about 100 flowering individuals in 1994. Vegetative rosettes and seedlings were present, but not counted.

Density: Plants observed to be widely scattered within small pockets of suitable habitat.

Presence of dispersed seed: None observed.

Evidence of reproduction: Plants observed in flower in 1994.

Evidence of expansion/contraction: No baseline information available to determine if this population is increasing, stable, or declining.

Occurrence # 007

Area: .1 acre.

Number and age of plants: 3 rosettes observed in Fall 1994. Additional plants may be in vicinity. Follow-up surveys

Table 2 (continued)

needed to confirm the identity of these plants.
Density: Plants clustered.
Presence of dispersed seed: None observed.
Evidence of reproduction: None observed.
Evidence of expansion/contraction: No baseline data are available.

2. Wind River Basin:

Occurrence # 002

Area: 50 + acres.

Number and age of plants: Population estimated at 5000-6000 plants in 1994 surveys. Additional unsurveyed habitat in immediate vicinity may contain an equal or greater number of plants.

Density: 1.4 plants per square meter were observed at a monitoring transect at this site in 1994. Colonies were observed to have a non-random, clumped distribution pattern.

Presence of dispersed seed: Dispersed fruits were not observed.

Evidence of reproduction: Flowering and fruiting plants have been observed at various subpopulations since 1990. Mature achenes were observed within fruiting heads of many individual plants. A high percentage of fruits, however, appeared to be aborted or have signs of predation.

Evidence of expansion/contraction: Six additional subpopulations were discovered in 1994 surveys. The type location (known since 1990) appears to be stable over the last 4 years. One subpopulation found to be abundant on the banks of a bladed dirt road, suggesting that the species is capable of colonizing disturbed areas.

Occurrence # 003

Area: 30 + acres.

Number and age of plants: Total population estimated at 700-1000 plants in 1994, divided into 4 subpopulations. 300-400 flowering plants observed on one slope.

Density: Plants often observed to be locally abundant within a narrow or restricted area of suitable habitat.

Presence of dispersed seed: None observed.

Evidence of reproduction: Plants observed in flower and fruit in 1991 and 1994.

Evidence of expansion/contraction: Population found to cover a much larger area in 1994 than previously reported.

Occurrence # 008

Area: 3 acres.

Number and age of plants: 50-100 flowering plants observed in 1994 survey. Vegetative rosettes and seedlings were observed, but not counted.

Density: Plants widely scattered.

Table 2 (continued)

Presence of dispersed seed: None observed.
Evidence of reproduction: Plants observed in flower in 1994.
Evidence of expansion/contraction: No baseline data are available to determine if this population is expanding, stable, or contracting.

Occurrence # 010

Area: Not known.

Number and age of plants: Population not censused in 1994, but observed to be very sparse.

Density: Plants widely scattered.

Presence of dispersed seed: None observed.

Evidence of reproduction: Plants observed in fruit in late summer, 1994.

Evidence of expansion/contraction: No baseline data are available to determine if this population is expanding, stable, or contracting.

Occurrence # 011

Area: About 5 acres.

Number and age of plants: Population not censused in 1994.

Density: Not known.

Presence of dispersed seed: None observed.

Evidence of reproduction: Plants observed in fruit in late summer, 1994.

Evidence of expansion/contraction: No baseline data are available to determine if this population is expanding, stable, or contracting.

Occurrence # 012

Area: Not known.

Number and age of plants: Population not censused in 1994.

Density: Not known.

Presence of dispersed seed: None observed.

Evidence of reproduction: Plants observed in fruit in late summer, 1994.

Evidence of expansion/contraction: No baseline data are available to determine if this population (composed of two subpopulations) is expanding, stable, or contracting.

3. Great Divide Basin

Occurrence # 006

Area: .1 acre.

Number and age of plants: 30-40 flowering plants observed in 1994. 50-100 plants intermediate between C. aridum and C. pulcherrimum were found in the immediate vicinity.

Density: Locally common within a very small area of suitable habitat.

Presence of dispersed seed: None observed.

Table 2 (continued)

Evidence of reproduction: Plants observed in flower in 1994.

Evidence of expansion/contraction: No baseline data are available to determine if this population is expanding, stable, or contracting. The abundance of dense shrubs in the immediate vicinity suggests that the population may be declining due to habitat loss.

2. COMPETITION: The adaptations of Cirsium aridum to barren, dry sites may make it vulnerable to shading or competition for soil nutrients and moisture from other species on adjacent sites with higher plant cover.
3. HERBIVORY: The spiny leaves, stems, and involucre of C. aridum appear to provide adequate protection from herbivory by large native and domestic grazers. Fruits were observed to exhibit high mortality due to herbivory by insects and possibly rodents.
4. HYBRIDIZATION: There is strong evidence to suggest that Cirsium aridum hybridizes with C. pulcherrimum throughout its range. Specimens with leaf pubescence intermediate between C. aridum and hairy forms of C. pulcherrimum were observed at numerous sites in 1994, including several populations where both species occurred together. Three populations of C. subniveum near Dubois in the northern Wind River Basin have pubescence and leaf decurrence characters approaching C. aridum. Hybridization is not uncommon in the genus Cirsium (Gardner 1974), and may be the result of recent and incomplete speciation events. Location information of suspected hybrid or intermediate plants is listed in Table 3.

H. LAND OWNERSHIP

1. BLM: All known occurrences of Cirsium aridum occur on surface lands managed by the BLM Rawlins and Rock Springs Districts. Several populations may also extend onto adjacent state or private lands. Managed areas are listed for each occurrence in Table 4.
2. STATE OF WYOMING: No populations were encountered on state lands during surveys in 1994. Location data from an annotated herbarium record suggest that part of the Red Hills population (west of Muddy Gap) may occur on both BLM and state lands. The specific location of this occurrence, however, is not clear from the specimen label.
3. PRIVATE: One occurrence of C. aridum is known to occur on a private section within the BLM checkerboard north of Rock Springs (Occurrence # 005). Four other occurrences, all based on annotated herbarium specimens, may extend from BLM lands onto adjacent private inholdings. Exact

Table 3.
Location Information for Suspected Hybrids
Between Cirsium aridum, C. pulcherrimum, and C. subniveum
In Wyoming

A. Intermediate between C. aridum and C. pulcherrimum
(determined as C. pulcherrimum)

Carbon County

1. T27N R88W S23. 8 mi SE of Muddy Gap Junction. Haines 5829 (RM).
2. T28N R90W S7. Willow Creek, 5 mi NW of Muddy Gap Junction. Haines 4492 (RM).

Fremont County

1. T28N R91W S22. Green Mountains. Haines 5670 (RM).
2. T30N R99W S8 SE4. SE slopes of Limestone Mountain. Fertig 14982 (RM).
3. T30N R99W S20 E2, S21 SW4. South end of Limestone Mountain, east of Beaver Creek. Fertig 15068 (RM).
4. T31N R99W S36 NW4NW4. Red Canyon Rim in dirt two-track. Fertig 14832 (RM).
5. T31N R95W S30 NW4. Devil's Gap-Beaver Rim. Fertig 14849 (RM).
6. T32N R95W S2. NE of Big Sand Draw Oil Field. Hartman 13560 (RM).
7. T41N R106W S31. Whiskey Basin. Benson 38 (RM).

Natrona County

1. T29N R89W S28, 33. 6 mi NNW of Muddy Gap. Haines 5202 (RM).
2. T31N R87W. Beaver Rim, ca 27 air mi NE of Jeffrey City. Hartman 13632 (RM).
3. T39N R86W S5. 14 air mi NNE of Arminto. Hartman 10449 (RM).

Sublette County

1. "Highway 189, 10 mi north of Big Piney". Gardner 204 B (RM).

Table 3 (continued)

Sweetwater County

1. T20N R99W S8 NW4. Ridge on E side of Tenmile Draw. Fertig 14883 (RM).
2. T23N R101W S4-5. Steamboat Mountain rim. Fertig 14869 (RM).
3. T24N R101W S29 SW4. About 1 mi N of Freighter Gap. Fertig 14873 (RM).
4. "Bitter Creek". Aven Nelson 3529 (RM). 12 July 1897.

B. Intermediate between C. aridum and C. subniveum (determined as C. subniveum)

Fremont County

1. T42N R106W S3, 4, 9, 10. Approximately 7 air mi NNE of Dubois, south side of Spring Mountain. Kirkpatrick 4003 (RM).
2. T43N R106W S36. Approximately 10 air mi NE of Dubois, in vicinity of north end of Black Mountain. Kirkpatrick 3872 (RM).
3. T43N R105W S30. Approximately 11 air mi NNW of Dubois, 0.5 mi west of the junction of Bear Creek and Bain Creek. Kirkpatrick 965 (RM).

Table 4.
Land Management Status of Known Occurrences
of Cirsium aridum

1. BLM Rawlins District

A. Great Divide Resource Area

Occ. # 015 (Little Cherry Creek, ca 5 miles N of Ferris Mountains) * May also occur on adjacent private inholdings.

B. Lander Resource Area

Occ. # 002 (Beaver Rim area, from Crooked Creek to Dishpan Butte and Cedar Rim)

Occ. # 003 (Beaver Divide on N side of rim)

Occ. # 008 (Table Mountain)

Occ. # 009 (Big Camp Creek, 6 miles W of Muddy Gap Junction) * May also occur on adjacent private inholdings.

Occ. # 010 (W slope Oil Mountain)

Occ. # 011 (3.5 miles WSW of Sweetwater Station)

Occ. # 012 (Beaver Rim, 11-13 miles SW of Sweetwater Station)

Occ. # 013 (Beaver Divide, 2 miles E of Mud Springs) * May also occur on adjacent private inholdings.

Occ. # 014 (Red Hills, W of Muddy Gap) * May also occur on adjacent state and private inholdings.

2. BLM Rock Springs District

A. Green River Resource Area

Occ. # 005 (E side White Mountain) * Also extends onto adjacent private lands within the BLM checkerboard.

Occ. # 006 (E end of Steamboat Mountain)

Occ. # 016 (ca 18 air miles N of Farson)

Occ. # 017 (Eden Reservoir)

B. Pinedale Resource Area

Occ. # 001 (ca 8 miles SE of Big Piney)

Occ. # 004 (Yellow Point Ridge)

Occ. # 007 (ca 6 miles ENE of Big Piney)

locations of these occurrences, however, cannot be determined from the label information.

IV. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- A. POTENTIAL THREATS TO CURRENTLY KNOWN POPULATIONS: The following potential threats were observed during field surveys in 1994 or have been reported in the literature:
1. MINERAL DEVELOPMENT: Oil and gas exploration is currently active in much of the range of C. aridum (particularly in the Green River Basin). Surface disturbances associated with testing seismic lines, and construction of roads and pipelines may have an impact on populations along slopes and rim margins (Fertig 1993). Road construction itself may ultimately open up new, barren habitat for the plants, but this benefit is probably negated by trampling by motorized vehicles.
 2. RECREATION: Off-road use of motorized vehicles is a potential threat to some populations through trampling of individual plants or removal of immature flowering heads. Trampling may also result in habitat degradation through soil compaction and erosion. Other recreational activities are not likely to have an impact on the species.
 3. WEED CONTROL: Spraying of herbicides to control populations of Canada thistle (Cirsium arvense) and other noxious weeds could be a potentially significant threat to C. aridum populations located near roadsides. The response of C. aridum to chemical herbicides is currently unknown, but is likely to be similar to that of other members of its genus. Use of biological methods of weed control could also have a potential impact if released control agents also utilize C. aridum.
 4. GRAZING: Cattle grazing occurs in the immediate vicinity of all populations of Cirsium aridum observed in the field in 1994. Livestock use of these sites was generally low due to the lack of sufficient forage and water. No C. aridum plants were observed to have been grazed by large ungulates, although some insect damage was evident. Trampling by livestock is not likely to be a significant threat.

B. MANAGEMENT PRACTICES AND RESPONSE: No experimental data exist on the response of this species to management actions, such as prescribed burning or herbicide treatment. Observations in 1994 suggest that Cirsium aridum is not impacted by livestock grazing. The presence of some occurrences along bladed dirt roads suggests that C. aridum is tolerant of some perturbations or is capable of pioneering disturbed sites.

C. CONSERVATION RECOMMENDATIONS

1. RECOMMENDATIONS REGARDING PRESENT OR ANTICIPATED ACTIVITIES: New roads should be rerouted around areas of occupied or potential habitat of Cirsium aridum to minimize the impacts of vehicle trampling on populations. Pipelines, seismic lines, and related construction associated with mineral exploration and development should be located off-site of occupied C. aridum habitat.

Weed control activities are probably unnecessary along the roadside habitats of C. aridum, due to the absence of most noxious weed species at these sites. If herbicide spraying is done in the immediate vicinity of known occurrences, personnel should be trained in the identification of C. aridum and spraying should be done on foot with backpack sprayers. Release of biological control agents in C. aridum habitat should not be done until the effects of these organisms on C. aridum is determined.

2. NOTIFICATION OF BLM PERSONNEL OF LOCATIONS ON BLM LANDS: To prevent inadvertent impacts to known populations, all appropriate BLM personnel involved in planning and on-the-ground land management activities should be provided with location data for Cirsium aridum. It is especially important that agency minerals, engineering, and range staff know precise locations so that disturbances can be avoided.
3. AREAS RECOMMENDED FOR PROTECTION: Three subpopulations of Occurrence # 002 of Cirsium aridum occur within the boundaries of the Beaver Rim Area of Critical Environmental Concern (ACEC) (Jones 1989). Other subpopulations along the south and west side of Cedar Rim, (approximately 3 air miles east of the ACEC) occur within an area recommended for ACEC designation to protect Yermo xanthocephalus and several other state and

regionally endemic species (Fertig 1995 in ed.). No other populations or subpopulations occur within currently designated or proposed ACECs or other special management areas on public lands.

- D. STATUS RECOMMENDATIONS: Cirsium aridum should continue to be listed as a C2 candidate by USFWS and as a Special Status plant species by the Rock Springs BLM. Although 1994-95 field surveys and herbarium studies resulted in the discovery of 13 additional occurrences, most known populations are restricted to small, isolated pockets of suitable habitat. Baseline population size data suggest that total numbers of the plants are relatively low. No population trend data are available to determine if the species is increasing, decreasing, or stable at this time. Additional surveys of likely habitat in central Wyoming should be conducted to locate potential new occurrences and follow-up surveys and monitoring of known sites should continue to elucidate population trends. Taxonomic studies, including analysis of cytogenetics and flavonoid chemistry, should be conducted to resolve difficulties in the delimitation of C. aridum and related species. Once trend data are available and taxonomic questions are resolved, the status of C. aridum should be reinvestigated and changed to C1 or 3C as appropriate.

The BLM Wyoming State Office should list Cirsium aridum as a state Sensitive species and develop appropriate management strategies to ensure that actions by agency personnel do not contribute to the further endangerment of the species and the subsequent need for listing under the Endangered Species Act.

- E. SUMMARY: Cirsium aridum is a recently described species restricted to the basins of central Wyoming. It can closely resemble pubescent forms of C. pulcherrimum and C. subniveum, and additional taxonomic study is needed to determine the relationships and delimitations of these species. C. aridum is currently listed as a C2 candidate species by USFWS and is managed as a Special Status plant species by the BLM Rock Springs District. Prior to 1994, the species was known from only four locations in the Wind River and Green River basins of Fremont and Sublette counties, Wyoming. During 1994-95, 13 additional locations were found during field surveys and herbarium studies at the RM. It is now also known to occur in the Sweetwater River Valley of Carbon County and in the Green River and Great Divide basins of Sweetwater County. 1994 surveys revealed that most populations were locally common within small,

isolated areas of suitable habitat. C. aridum is found primarily on barren slopes, fans, and draws on whitish-gray, chalky sandstones, colluvium, and clays with low vegetative cover within wider expanses of Wyoming big sagebrush grasslands. Individual populations range in size from 3 to 6,000 individuals covering areas of 0.1 to over 50 acres. The primary threat to the species at present is trampling from off-road vehicles and habitat degradation due to mineral exploration and development. Weed control projects may also pose a threat, although additional data are needed to determine the impacts of chemical sprays and biological control agents on this species. Due to the patchy distribution of its habitat, most threats to C. aridum can be reduced or removed by avoidance strategies. Only three small colonies (all within the same population) are currently known from a designated special management area (the Beaver Rim ACEC). Follow-up surveys and censuses are recommended to determine population trends of the species. Until these studies are completed it is recommended that C. aridum remain a C2 candidate and be officially designated as a Sensitive species by the BLM Wyoming State Office.

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Update and Corrections
to the Status Report on
Cirsium aridum in west-central Wyoming

Prepared for the Bureau of Land Management
Wyoming State Office, Rawlins District
and Rock Springs District

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5 May 1995

I. INTRODUCTION

After submitting the final edition of the status survey of Cirsium aridum (Fertig 1995), Robert Dorn and I reviewed all Wyoming specimens of C. aridum and C. pulcherrimum to determine the identity of numerous "intermediate" specimens from central Wyoming. As a result of this review, we have determined several additional characters useful in distinguishing these two taxa and have annotated several specimens attributed to C. aridum in the original status report. This update of the status report includes revised data and updated Element Occurrence Records.

II. REVISION OF THE 1995 STATUS SURVEY (Fertig 1995)

Page 4 (III. C. 1.) Some additional characters of Cirsium aridum helpful in identification include: (1) the inflorescence is compact, strictly terminal, and composed of 1-4 heads (instead of up to 7 as originally reported); (2) stems are slender throughout (not thickened at the base); (3) stems are often clustered from a branched rootstalk. These characters are not included in Dorn (1992).

Page 8 (III. C. 4.) Pubescent forms of Cirsium pulcherrimum can be distinguished from C. aridum by typically having more than 4 heads in an elongate inflorescence, a bright green surface beneath the white pubescence on upper leaf surfaces, taller stems that are often thickened at the base, and a rootstalk that may be unbranched.

Page 9 (III. D. 1.) Following a revision of existing specimens, Cirsium aridum is now known only from the Wind River Basin, Sweetwater River Valley, and Green River Basin. Specimens attributed to the western Great Divide Basin and the southern Green River Basin in Sweetwater County are now known to be pubescent forms of C. pulcherrimum. The known range of C. aridum is now known to be approximately 30 miles x 135 miles (4050 square miles), less than half of what was previously reported.

Page 9 (III. D. 2.) Six of the nine newly discovered populations of C. aridum found in 1994 have proven to be pubescent forms of C. pulcherrimum. All other populations documented in field surveys or from annotated herbarium specimens are C. aridum. In all, 11 extant populations are currently recognized in the state.

Page 9 (III. D. 5.) Sites in the southern Green River Basin and the Great Divide Basin in Sweetwater County were

surveyed, but only populations of pubescent forms of C. pulcherrimum were encountered.

Page 10 (Figure 3) See revised figure 3 in this report.

Pages 11-15 (Table 1) Delete occurrence #s 005, 016, and 017 under the Green River Basin, occurrence #s 008 and 011 under the Wind River Basin, and occurrence # 006 under the Great Divide Basin. Delete T31N R95W Secs 21-22 and T31N R95W S27 SE4 of NW4 under EO # 002.

Page 21 (III. F. 2.) There are currently only 11 known populations of Cirsium aridum in Wyoming (rather than 17 as reported). The "loss" of six populations does not significantly alter the total population estimate of 40,000-50,000 individuals. The total occupied acreage drops by only about 15 acres (from 150 to 135).

Pages 23-26 (Table 2) Delete demographic information from occurrence # 005, 006, 008, and 011.

Page 27 (III. H. 3.) Occurrence # 005 is now known to be a pubescent form of C. pulcherrimum rather than C. aridum. No occurrences of C. aridum are now positively known from private lands.

Page 30 (Table 4) Delete occurrences 005, 006, 008, 011, 016, and 017 from the table. No populations of C. aridum are now known to occur within the Green River Resource Area of the BLM Rock Springs District as originally reported.

Page 33 (IV. D.) Only 7 new occurrences of C. aridum have been documented through field surveys and examination of herbarium material.

Pages 33-34 (IV. E.) Cirsium aridum is now known from 11 extant occurrences in the Green River Basin, Sweetwater River Valley, and Wind River Basin of Carbon, Fremont, and Sublette counties, Wyoming. Reports of the species from the Great Divide Basin and Sweetwater County are now known to be based on misidentified pubescent forms of C. pulcherrimum.

Appendix A. Revised printouts of EO #s 001, 002, 005, 006, 008, 011, 016, and 017 are included. A revised map of Occurrence # 002 (page 45) is also included.

III. REFERENCES

- Dorn, R. D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY. 340 pp.
- Fertig, W. 1995. Status report on Cirsium aridum in west-central Wyoming. Unpublished report prepared for the BLM Wyoming State Office, Rawlins District, and Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY. 105 pp.

Figure 3. Revised Wyoming distribution of Cirsium aridum.

